

We claim:

1. An adjustable swage for use on a downhole tubular, comprising:
a rounded body mounted to a mandrel wherein said body is movable into a plurality of positions to create a variety of profiles effective for a full 360° about said mandrel.
2. The swage of claim 1, wherein:
said profiles comprise circular and non-circular shapes.
3. The swage of claim 1, wherein:
said round body comprises a plurality of articulated components that allow the profile to be reduced in response to a portion of the tubular that resists expansion while permitting a larger profile dimension in other parts of the tubular where there is no such resistance.
4. The swage of claim 3, wherein:
said articulated components present no gaps along said profile.
5. The swage of claim 3, wherein:
said articulated components present gaps along said profile.
6. The swage of claim 3, wherein:
said articulated components move relatively to each other to change the dimension on at least a portion of said profile.
7. The swage of claim 6, wherein:
said articulated components rotate on adjacent edge arcuate surfaces.

8. The swage of claim 7, further comprising:
a retention device mounted around said articulated components to hold them together.
9. The swage of claim 6, wherein:
said articulated components are retained to each other within said profile.
10. The swage of claim 9, wherein:
pairs of said articulated components are retained to each other by a tongue and groove connection.
11. The swage of claim 10, wherein:
said tongue and groove connection has a longitudinal axis whereupon adjacent articulated components that are secured by said tongue and groove connection can rotate with respect to each other about said longitudinal axis of said tongue and groove joint.
12. The swage of claim 11, wherein:
gaps along said profile close to reduce its dimension to clear an obstruction while gaps widen to increase said profile in other location to achieve, in other zones where there is insufficient resistance, the desired expansion of the tubular.
13. The swage of claim 1, wherein:
said body is formed of a plurality of abutting segments movable with respect to each other.
14. The swage of claim 13, wherein:
said segments each comprise a high location and at least some of said segments are movable to selectively align said high locations to obtain a maximum diameter or to offset them to attain a minimum diameter.

15. The swage of claim 13,wherein:

said mandrel has a longitudinal axis and said segments slide relatively to each other in the direction of said longitudinal axis.

16. The swage of claim 15,wherein:

said segments are retained to each other while moving relatively to each other in a longitudinal direction.

17. The swage of claim 16,wherein:

said segments are retained to each other at their abutting edges by a tongue and groove connection.

18. The swage of claim 13,wherein:

said segments are wedge shaped having a narrow end and a wide end and are arranged in an alternating pattern where the narrow end of one segment, in a first orientation, is adjacent the wide end of a neighboring segment, in a second orientation, on either side.

19. The swage of claim 18,wherein:

said segments in one of said first and second orientations is selectively held fixed and said segments in the other of said first and second orientations is movable.

20. The swage of claim 19,wherein:

said segments each comprise a high location and at least some of said segments are movable to selectively align said high locations to obtain a maximum diameter or to offset them to attain a minimum diameter.

21. The swage of claim **20**,wherein:

said movable segments are biased in the direction to obtain said maximum diameter.

22. The swage of claim **21**,wherein:

said movable segments are driven as well as biased in the direction to obtain said maximum diameter.

23. The swage of claim **22**,wherein:

said movement of said movable segments toward said maximum diameter is in conjunction with a ratchet which prevents said movable segments from movement in a reversed direction.

24. The swage of claim **23**,wherein:

said segments that are held fixed are secured to a ring, whereupon relative rotation between said ring and said mandrel moves said segments formerly held fixed away from said movable segments to allow said body to move toward said minimum diameter.

25. The swage of claim **22**,wherein:

said movable segments are driven by a piston driven by fluid pressure applied to it through said mandrel; and

said bias is provided by a stack of Belleville washers.

26. The swage of claim **20**,wherein:

said mandrel has a longitudinal axis and said segments slide relatively to each other in the direction of said longitudinal axis.

27. The swage of claim **26**,wherein:

said segments are retained to each other while moving relatively to each other in a longitudinal direction.

28. The swage of claim **27**,wherein:

said segments are retained to each other at their abutting edges by a tongue and groove connection.